



AD-A286 070



SCALPEL DEVELOPMENT PROGRAM

CONTRACT DELIVERABLE A006: Quarterly R&D Status and Management Report

June 1-August 31, 1994

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Second Quarter R&D Status and Management Report

Reporting Period: June 1 - August 31, 1994

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Progress During the Reporting Period:

Task 1.1. System Engineering And Modeling

A-1

We have made good progress in Task 1 this quarter. We have completed the preliminary modeling of the SCALPEL Proof-of-Concept Projection Optic (SOW 1.1.2).

Using industry standard tools we have designed and analyzed an anti-symmetric electron optical doublet for use as the projection sub system. The baseline for the analysis was derived from consideration of the subsystem error budget. We have presented detailed results from numerical calculations of the lens aberration performance. We have decided upon specific lens configurations and analyzed the tolerances required for manufacturing.

We have optimized the resolution performance of the projection optic sub system by choice of numerical aperture.



Task 1.2. Basic Concept Evaluation Experiments

Our primary goal for this quarter and this task was to complete the evaluation of mask contrast formation (SOW 1.2.2). This has been done and is reported in CDRL A002 which is submitted concurrently with this document.

Task 1.3. Design of Proof-of-Concept System

This task started on schedule at the beginning of the second quarter, i.e. 6/1/93. We have made excellent progress in all the sub system designs (SOW 1.3.1, 1.3.2, 1.3.3). This work is reported in CDRL A003 which is scheduled for presentation and submission on 11/14/94.

Task 1.4. Mask Development

Significant progress has been made in this task during the last three months. We have brought together all the requirements for the mask structure and completed the task of deciding on the materials to be used for construction (SOW 1.4.3).

Task 1.5. Resist Development

During this period we have started the task of resist characterization using the Small-Field-of-View Exposure Tool (SOW 1.2.1). The characterization is based



on the requirements and specifications previously discussed (SOW 1.5.3). The resist requirements will be reviewed as part of CDRL A003.

Planned Activities and Milestones for Next Reporting Period:

Task 1.1. System Engineering And Modeling

At the end of the third quarter we will complete the full electron optical modeling for both upper and lower columns. We will also complete the modeling and optimization of the mask structure.

Task 1.2. Basic Concept Evaluation Experiments

We will complete the investigation of the feasibility of registration and alignment in a SCALPEL system.

Task 1.3. Design of Proof-of-Concept System

We will continue with the design of all sub systems of the SCALPEL Proof-of-Concept System.

Task 1.4. Mask Development

During this period we will begin the detailed design and fabrication of a mask blank suitable for use in the SCALPEL Proof-of-Concept System.



Task 1.5. Resist Development

The preliminary analysis of resist characterization studies will be completed.

Equipment Purchased or Constructed During the Period:

We have neither purchased nor constructed any major experimental or special equipment during the period.

Changes in Key Personnel During Period: None

Substantive Information Gained From Trips and Conferences: None

Summary of Problems or Concerns: None

Related Accomplishments Since Last Report: None



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